Mobile-assisted language learning [Revised and updated version]

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Mobile-Assisted Language Learning

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Abstract
Mobile-assisted language learning (MALL) is the use of smartphones and other mobile technologies in language learning, especially in situations where portability and situated learning offer specific advantages. A key attraction of mobile learning is the ubiquity of mobile phones. Typical applications can support learners in reading, listening, speaking and writing in the target language, either individually or in collaboration with one another. Increasingly, MALL applications relate language learning to a person's physical context when mobile, primarily to provide access to location-specific language material or to enable learners to capture aspects of language use *in situ* and share it with others. Mobile learning can be formal or informal, and mobile devices may form a bridge connecting in-class and out-of-class learning. When learning takes place outside the classroom, it is often beyond the reach and control of the teacher. This can be perceived as a threat, but it is also an opportunity to revitalize and rethink current approaches to teaching and learning. Mobile learning appeals to a wide range of people for a variety of reasons. It may exclude some learners but it is often a mechanism for inclusion. It is likely that the next generation of mobile learning will be more ubiquitous, which means that there will be smart systems everywhere for digital learning. Mobile learning is proving its potential to address authentic learner needs at the point at which they arise, and to deliver more flexible models of language learning.

Keywords [smartphones, tablets, iPad, situated learning, location-based learning, apps, e-books, augmented reality, accessibility, disability, inclusion]

Main text
Mobile-assisted language learning (MALL) is the use of smartphones and other mobile technologies in language learning, especially in situations where portability and situated learning offer specific advantages. The main advantages of MALL are immediate access to information, social networks, and situation-relevant help; flexible use of time and space for learning; continuity of learning between different settings; good alignment with personal needs and preferences; easy creation and sharing of simple content like photos, videos and audio recordings; and greater opportunity for sustained language practice while carrying out activities such as walking, waiting, or commuting. Hwang Shih, Ma, Shadiev and Chen (2016) show the benefits of a mobile learning design that involved students applying their knowledge to real situations and creating meaningful learning material, which led to more frequent language practice.

A key attraction of mobile learning is the ubiquity of mobile phones, both smartphones and less powerful feature phones. The number of mobile subscribers is predicted to reach 5.9 billion by 2025, equivalent to 71% of the world's population (GSMA, 2018). This greatly extends the reach of MALL to groups that have lacked opportunities for language learning or have had limited access to learning materials and resources. At the same time, the increasingly

ubiquitous presence of mobile devices in many areas of life encourages a blurring of boundaries between daily life, entertainment, work and learning. This presents a challenge to conventional, orderly, formal ways of teaching and learning. There is also reason to be concerned about some excessive uses and misuses of mobile phones and associated issues of safety, health, and well-being.

Besides mobile phones, portable devices used for language learning include tablets, digital audio players, electronic dictionaries, e-book readers and handheld game consoles. Access to Wi-Fi and GPS (global positioning system) can multiply the possibilities for learning on the move, especially when there is free access to the Internet and social media, and the chance to use location-based services and tools. MALL may also be supported by wearable devices, for example language translation that can be delivered via wearable ear buds that may look like earphones (Gibbs, 2017). Some people will see translation tools as a threat to language learning, while others may find ways to design activities that incorporate it into teaching and learning.

[A]MALL in Relation to CALL

MALL may still be perceived by some as just another form of computer-assisted language learning (CALL) except that it involves the use of mobile technologies. However, there are considerable differences between CALL and MALL. Since mobile devices provide users with more immediate access to the Internet and to an abundance of apps (applications), many language learners now have access to possibly more attractive alternatives to formal language learning, such as listening to foreign-language radio on the go, playing language games while queuing, reading blog posts related to personal interests while on holiday, or watching foreign movies while traveling on business. What is more, carrying out conventional language-learning activities such as vocabulary learning in different settings (on the bus, in a café, in a queue) arguably changes the activities, as they vie for attention in noisy, changeable, stimulating environments that may be at once distracting and potentially enriching. Photos, videos and audio notes can be used to capture language in use or observations about a situation or setting in which it is used. This captured information can be a lasting memory aid and a tangible link between different learning environments—for example, a captured record of a language issue encountered in a work situation taken into a language class where the issue is discussed. For all these reasons, Kukulska-Hulme and Shield (2008, p. 273) explain that "MALL differs from computer-assisted language learning in its use of personal, portable devices that enable new ways of learning emphasizing continuity or spontaneity of access and interaction across different contexts of use." Jarvis and Achilleos (2013) suggest a new term and acronym, mobile assisted language use (MALU), since learners have many opportunities to "pick up" a language through daily use of mobile devices for a range of social or academic purposes – this is particularly the case for learners of English.

[A]Typical Applications

Different types of MALL applications include those that are designed for language study and those that are not explicitly designed for language learners but can be used to support learning, for example, automatic translation or apps that enable image editing. In terms of applications designed for language study, initially vocabulary and grammar learning proved to be popular. Early published studies reported on the use of text messaging and e-mail for vocabulary learning, including timed interval learning (e.g., Levy & Kennedy, 2005). Stockwell's (2007) intelligent tutor system created a profile of each learner and then delivered vocabulary activities according to the areas they found most difficult. Grammar practice has also received considerable attention. Samuels (2003) described the use of handheld computers for activities

such as grammar drills, adding diacritics to Latin texts and participating in synchronous chat. Castañeda and Cho (2016) reported significant improvements in students' verb conjugation knowledge after they used a game-like app.

Although resources and applications have tended to focus on the individual learner, there are also reports of collaborative language learning supported by mobile devices (Kukulska-Hulme & Viberg, 2018). Learners can use their mobile devices to join communities of online learners where language skills may be practiced with other members (Niesner, 2010). Joseph (2009) described a "crowdsourcing" approach which combined mobile content with materials on language and culture produced by learners and shared via a community site. Learner-generated and shared language content was also the basis for the Cloudbank and LingoBee apps described by Petersen, Procter-Legg and Cacchione (2014).

[A]Reading and Listening

With the adoption of e-book readers (devices for reading electronic books) and e-book software on other portable devices, together with facilities such as integrated dictionaries, parallel texts, and tools for translation, reading in other languages becomes a more attractive possibility, especially for those who have a long daily commute or who spend most of their time away from a fixed computer. The use of mobile devices to access newspapers and other news channels has extended opportunities to read in a second or foreign language on a regular basis. Incidental learning of vocabulary from reading can be supported through e-books with dictionaries or adaptive software for vocabulary learning; however, unless learners are highly self-motivated, the effectiveness of this method of learning will depend on good pedagogical design (Fisher et al., 2009). Lin (2014) found positive effects of using tablets in an extensive reading programme encouraging reading outside the classroom and evidence of collaboration among the learners. Access to podcasts and other audio channels has also extended opportunities to listen to languages more frequently, on a casual basis or as part of a routine that may include regular travel. Listening activities on a mobile phone or MP3 player can be carried out successfully while waiting for someone in a car, walking around the house and garden, or traveling (Demouy & Kukulska-Hulme, 2010). The Audio News Trainer (ANT) app provided news audio recordings to motivate listening comprehension practice on mobile phones, with additional social media-based interaction to enable sharing and commenting on summaries of news (Read and Kukulska-Hulme, 2015).

[A]Speaking and Writing

Portable devices make it easier for unconfident learners to find private spaces to practice speaking or pronunciation; even within the home, a computer shared with friends or family members may offer less privacy. The ability to practice speaking and receive private feedback from teachers, while also being able to connect and practice with other learners, were positive factors identified in a successful project with young people who were using mobile phones to learn Irish (Keogh & Ní Mhurchú, 2009). Kirsch (2016) studied children's collaborative storytelling with the iPad, using an app that enabled recording, editing and playback of oral language; the activity promoted exploratory talk and reflection on language. Writing practice can be more problematic since it is largely constrained by means of input such as small screens and keyboards, which can present a barrier to extensive writing. On the other hand, optical character recognition can enable learners to practice writing unfamiliar scripts such as Japanese kanji characters on phones equipped with a stylus (Koga et al., 2005). Hwang, Chen, Shadiev, Huang, and Chen (2014) have worked on improving elementary school learners' writing skills in English through situated activities involving comments made by peers. The adoption of tools for collaborative annotation of texts, which may be done remotely or by passing round a

portable device in class, means that each learner can add a comment. Motivation may be heightened by the possibility of sharing immediately what has been written, including through social media or mobile blogging.

[A]Location-Specific Language Learning

Increasingly, MALL applications relate language learning to a person's physical context when mobile, primarily to provide access to location-specific language material (e.g., useful vocabulary and phrases) or to enable learners to capture aspects of language use *in situ* and share it with others. Applications like these make use of technologies that detect a learner's presence and enable media such as photographs, sketches, maps, audio, and video clips, to be associated with a physical space for subsequent retrieval. One early system of this type provided learners of Japanese with appropriate polite expressions for their current context (Ogata & Yano, 2004). In a similar vein, Beaudin, Intille, Tapia, Rockinson, and Morris (2007) explored the use of sensors in the home for context-sensitive learning of vocabulary on a mobile device: sensors detected learners' interactions with objects in the home, and this triggered the audio presentation of English and Spanish phrases associated with the use of these objects. Ogata, Yin, El-Bishouty, and Yano (2010) describe a system that detects physical objects around the learner using radio-frequency identification (RFID) tags, and assigns questions related to the detected object, to improve vocabulary knowledge; this learning environment also allows the participants to share their knowledge. Liu, Chen, and Hwang (2018) designed a system for collaborative listening activities in a fitness center, with language learners watching videos on their phones and then QR codes at the fitness center being used as a mechanism for accessing a quiz, getting information about items of fitness equipment, and enabling collaboration on tasks. Augmented reality (AR) can be used to enrich or gamify a mobile learning experience; when an AR app recognizes an object through the user's camera, an action is triggered on the phone such as displaying text relating to that object, showing social media posts, or playing a sound (Godwin-Jones, 2016). All these applications and systems focus primarily on learners' mobility and interaction in a designated space, although some activities may be carried out anywhere and at any time.

[A]Support for Informal Learning

Mobile learning is poised at the intersection of formal and informal learning, with mobile devices forming a bridge between the two spheres. In a formal education scenario, Shao, Crook, and Koleva (2007) proposed an informal mobile group blog to support students spending time at a foreign university; this enabled the students to share observations about local language use and customs. A similar intent could be discerned in the work of Pemberton, Winter, and Fallahkhair (2010), whose collaborative mobile knowledge-sharing system for language learners included learner-generated content and a social network to help international students further their knowledge and understanding of local language and culture in the country where they were studying. Other researchers have also shown interest in informal learning; for example, Song and Fox (2008) reported how some student learners of English used mobile devices to support and extend their learning, driven by a goal to take every opportunity to learn new vocabulary in English. Jones (2015) found that learners of Welsh, whom she interviewed and surveyed, used mobile technologies extensively to access a wide range of resources. Kukulska-Hulme and Bull (2009) related mobile learning to the issue of "noticing" in second language acquisition, arguing that mobile devices can support noticing; in addition they noted that recording consciously observed features also provides a method of obtaining data on what learners notice, when researching second language learning.

[A]Control Over Learning

Mobile technology introduces greater flexibility into classroom teaching and it takes learning out of the classroom, often beyond the reach and control of the teacher. This can be perceived as a threat, but it is also clearly an opportunity to revitalize and rethink current approaches to teaching and learning. A framework and guide for teachers to help them rethink their practice and to design mobile learning activities has been provided by Kukulska-Hulme, Norris and Donohue (2015). Tracking of learners' actions and behaviors is becoming more common and some mobile learning platforms come with administration programs that track what the students do and how long they do it, reporting it back to the teacher. This can pose a challenge in terms of blurring the boundary between learning and leisure time, if learning is tracked beyond the classroom; learners can become stressed and resentful. It is important to develop mobile learning designs that clearly identify what is best learned in classrooms (real and virtual), what can or should be learned outside (in scheduled time and beyond), and the ways in which connections between these settings can be made. This is best done in consultation with learners.

[A]Mobile Learners

Mobile learning appeals to a wide range of people, but there are specific groups that have been targeted or have been shown to benefit, and other groups that may have been neglected (Kukulska-Hulme, 2013). Researchers have cautioned against assuming that the younger generation will automatically like using mobile devices for learning, even if they are avid users of mobile phones and music players in their everyday lives; nevertheless there is growing evidence that if the benefits to the learner of using mobile technology are made evident, uptake increases.

Mobile learners are those who benefit from mobile learning either because they are frequently mobile or because this type of learning is the most appropriate and convenient for them. In the first category are those with mobile lifestyles or whose work involves moving around different locations or substantial travel, for example business professionals needing to improve their language skills quickly on their way to a destination and for specific purposes such as interviews and meetings. In the second category are those who would otherwise find it difficult to access learning opportunities at times and locations to suit them. These categories may overlap, most notably in the case of migrants and refugees. In addition, mobile learning may simply be a preferred way to learn. For example, learners often appreciate the increased social contact and peer support they can draw on when faced with the need to fit language-learning study and assessment deadlines into increasingly complex lives. When both online and mobile access modes are made available, some learners will opt for one of these while others will make use of both, perhaps changing from one to the other according to their needs and circumstances.

[A]Accessibility and Usability

Mobile populations such as migrants often have an urgent need to improve their language skills for work and for social inclusion. Such groups frequently have ready access to mobile phones but perhaps not the latest models, and they may not have the necessary digital skills to make full use of mobile phones for language learning. Danaher, Moriarty, and Danaher (2009) working with mobile communities drew attention to the fact that access to suitable technologies was often limited to the scope and duration of particular projects (p. 62); how to deal with this issue should still be considered in any new projects.

It has also been argued that mobile device use excludes some learners who have physical difficulties. Older learners are more likely to have more problems with eyesight, hearing and manual dexterity, which may affect their ability to participate fully in mobile learning, but these

problems are not limited to the older age group. The relatively small size of handheld devices presents some challenges in terms of usability (reading text, on-screen interaction), although this has become less of an issue as new device and user interface designs are continually improving. Speech recognition can make interaction easier for some users and in situations where speech is a more natural medium than writing or typing. Learners with physical conditions meaning they are unable to sit upright for long periods in front of a computer appreciate being able to access reading materials and other activities on a mobile device, since this accommodates a range of positions. Also, students with visual impairments or dyslexia need not be excluded if they are able to listen to digital talking books or podcasts instead of reading (Barton, Penny, & Riordan, 2007). Skiada, Soroniati, Gardeli and Zissis (2014) developed a game-based mobile application for children with dyslexia which could help the children improve some fundamental skills such as reading comprehension. It is advisable to involve a range of target users and a variety of physical settings in the design, testing and evaluation of all mobile-learning developments.

[A]MALL Within Mobile Learning

Mobile-assisted language learning is part of the broader field of mobile, ubiquitous, and contextual learning, also known simply as mobile learning. While, in the early days, mobile learning was often defined in terms of its use of mobile technologies, researchers gradually began to emphasize the mobility of the learner. Winters (2006) noted that due to the rapid uptake of mobile learning in many different communities, the concept had become ill-defined and needed to be reconceptualized, finally suggesting that "learning is mediated through mobile technologies, which are in themselves interwoven with other learning tools" (Winters, 2006, p. 11). Indeed, increasingly, mobile-learning scenarios feature portable devices being used as part of a rich repertoire or blend of technologies and media, used as and when required by learners who may extend their studies beyond the traditional or virtual classroom. Learners who are supported in this way may even be better equipped to become lifelong learners, seeking to continually and opportunistically update and improve their language competences over the course of a lifetime. According to Ally and Prieto-Blázquez (2014), the next generation of mobile learning will be more ubiquitous and there will be smart systems everywhere that people can learn from. The fields of mobile and ubiquitous learning are converging, and this will be reflected in new applications for MALL.

[A]Summary

Mobile-assisted language learning is one of the key application areas of mobile learning and is likely to continue to grow. Mobile learning is proving its potential to address authentic learner needs at the point at which they arise, and to deliver more flexible models of language learning. It supports skill development in reading, listening, speaking and writing, and introduces innovations through location-based learning and by linking formal and informal settings. It requires a good understanding of learner mobility, and highlights issues of accessibility, usability and inclusion. Learner expectations, skills and habits, as well as those of teachers, need to evolve to match the potential of mobile and ubiquitous technologies. This should result in new designs for language learning that relate more closely to emerging patterns of technology ownership, time use, mobility, and access.

SEE ALSO:
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wbeal0180.pub2
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